

CSV File Summary

Each row in the file represents a “call” from a compacting Bigbelly hub. The rows are ordered by Station ID.

The format for each row of data is:

Station ID, Timestamp, LED Fullness, Analog Fullness, Collection Call?

Station ID –

- The unique ID for the Bigbelly calling

Timestamp –

- Timestamp for this call provided in YYYY-MM-DD HH:MM:SS 24-hour format in the Eastern Standard Time Zone (EST)

LED Fullness and Analog Fullness –

- The %-fullness of the waste bin provided using two methods:
 - “LED Fullness” is the %-full based on the current LED value shown at the Bigbelly which represents simplified levels: 20%, 60% or 100%
 - “Analog Fullness” is the %-full based on an algorithm which represents 10 more specific levels: 0%, or 20-100% in 10% increments

Collection Call –

- True or False depending on whether this call was triggered by a collection event occurring at the Bigbelly

Examples

```
1400787,2014-11-14 15:17:16,60,40,False
```

Station ID 1400787 called on November 14, 2014 at 3:17PM with an LED Fullness of '60' (Yellow LED flashing) and has an estimated Analog Fullness of 40%. This was not a collection call.

```
1400787,2014-11-15 02:04:26,20,0,True
```

Station ID 1400787 called on November 15, 2014 at 2:04AM with an LED Fullness of '20' (Green LED flashing) and has an estimated Analog Fullness of 0%. This was a collection call.

City of Boston Bigbelly Data

A Comma Separated Values (CSV) collection of data is being provided which has been collated from a selected group of Bigbelly waste receptacles within the City of Boston.

Each line in the file represents a single “call” from a Bigbelly which represents a snapshot of the current status of that Bigbelly receptacle at the time of the call.

Calls are made by the Bigbelly for a variety of reasons including:

- Waste Bin Fullness Change
- Waste Door Opening
- Periodic Time Out (Each Bigbelly is programmed to call at least every 12 hours)

Background Information Regarding Fullness

Bigbelly's contain compactors which crush waste within their waste bins in order to reduce the volume required to store the waste deposited into the Bigbelly. The compactors are able provide an average compaction ratio of 5:1, meaning a Bigbelly can store the equivalent of 150G (gallons) of *uncompacted* waste within a standard 30G waste bin. The compactor in a Bigbelly will run when it has detected that waste within the bin has reached a certain level. After a compaction cycle the waste will be crushed to occupy a smaller amount of space within the waste bin. These cycles are repeated as more waste is added to the Bigbelly. After approximately 150G of uncompacted waste has been added to the Bigbelly the compactor will not be able to compress the waste further, this condition is detected and the waste bin is considered to be full.

When the waste collection door of a Bigbelly is opened it is assumed that the waste bin has been emptied, this is considered a waste “collection” event.

Up to this point in time fullness levels have been provided at both the Bigbelly itself and within the CLEAN service as three color coded levels—Green, Yellow, Red. These are referred to in this document as “LED Fullness”.

Each of these color coded levels represents a specific volume of waste collected in the bin:

- Green = ~30 uncompacted gallons (20% of the waste bin capacity)
- Yellow = ~90 uncompacted gallons (60% of the waste bin capacity)
- Red = ~150 uncompacted gallons (100% of the waste bin capacity)

These simplified levels are provided to make it quicker and easier to determine when collection should be performed at the Bigbelly—Green indicates a Bigbelly which does not require waste pickup.

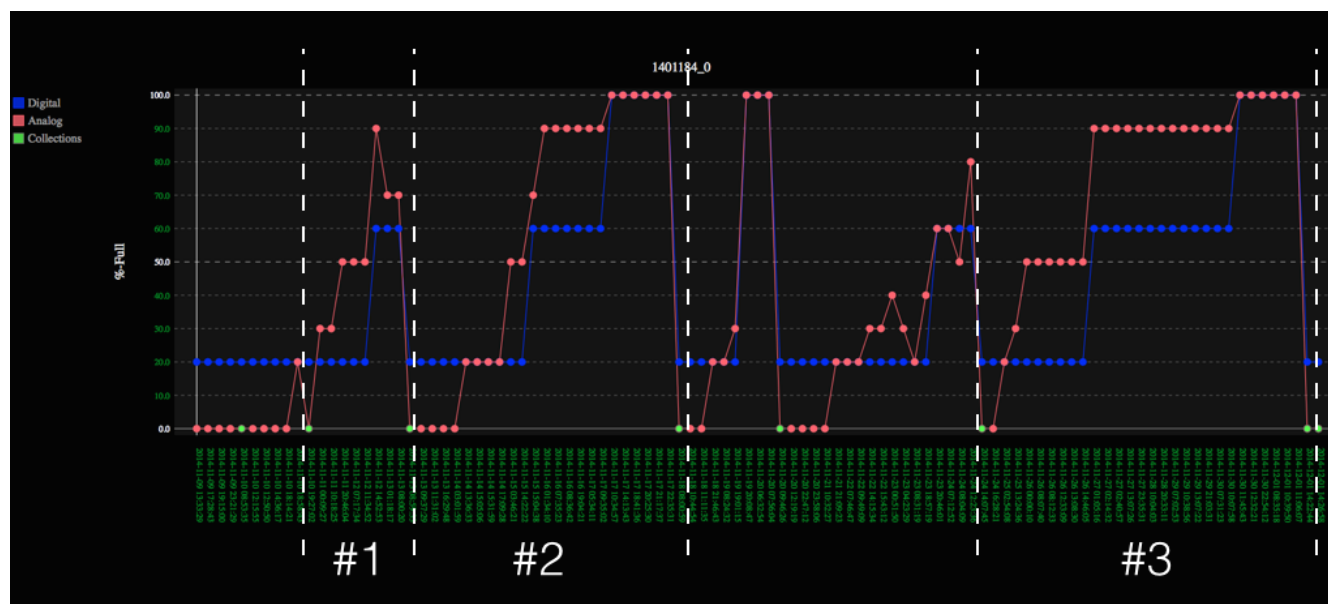
Yellow indicates a Bigbelly which should be scheduled for pickup. Red indicates a Bigbelly which is full is requires immediate service to prevent or correct an overfill.

Analog Fullness Advantages

In order to facilitate better waste collection planning in the future Bigbelly is now testing providing a more specific fullness level now referred to as “Analog Fullness” alongside the existing LED Fullness.

Analog Fullness provides greater insight into the specific fullness of a Bigbelly at any given time which can help to provide better fill prediction and prioritization of scheduled pickups based on fullness.

The following example is graphical representation of the CSV data comparing Analog Fullness (Red) to LED/Digital Fullness (Blue), including Collection Events (Yellow dot at 0 on the Y-axis)



In the example above three areas between waste collections have been highlighted and labeled as #1-3.

In all three areas Analog Fullness can be seen to provide fullness trending and an earlier warning of high fullness levels (versus LED Fullness) which could be used to enable better prediction of when a pickup is needed or to prioritize waste pickups during busy times.

Specifically Area #3 is a good example of how Analog Fullness can improve efficiency of waste collection personnel and reduce the risk of overfilled Bigbelly's.

In the earlier portion of #3 Analog Fullness reflects a 50% full waste bin, this would be considered a 'Green' Bigbelly using LED Fullness. If a waste collector is in the area servicing other Bigbelly's, this unit could be a candidate for early pickup.

In the later portion of #3 the Bigbelly becomes heavily used which results in an LED Fullness transition to 'Yellow', however Analog Fullness provides the additional level of insight into the fullness to show that it's nearly full and may be a higher priority to pick vs. another 'Yellow' Bigbelly.